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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/941,250	08/28/2001	Andrew P. Smith	1166/60353-B	6586

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Ivan S. Kavrukov
Cooper & Dunham LLP
1185 Avenue of the Americas
New York, NY 10036

EXAMINER

HO, ALLEN C

ART UNIT	PAPER NUMBER
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2882

DATE MAILED: 12/23/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/941,250

Applicant(s)

SMITH ET AL.

Examiner

Allen C. Ho

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 November 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-7 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-6 is/are rejected.
- 7) ☒ Claim(s) 7 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- 1) ☐ Certified copies of the priority documents have been received.
 - 2) ☐ Certified copies of the priority documents have been received in Application No. _____.
 - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
- a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Negrelli (U. S. Patent No. 6,200,024 B1) in view of Stenfors (U. S. Patent No. 6,309,102 B1).

With regard to claim 1, Negrelli disclosed a system positioning a digital flat panel x-ray receptor for a variety of diagnostic x-ray protocols, comprising: at least one x-ray source (44) selectively emitting an x-ray beam; a digital flat panel x-ray receptor (48) having an imaging face; a downwardly extending, ceiling-supported column (106) supporting the receptor for movement to different positions up and down along a downwardly extending axis, rotating (100) about the same or a different downwardly extending axis, and rotating (108) about a lateral axis transverse to the axis along which the receptor moves up and down; the receptor and at least one x-ray source being mounted on separate supports for movement independent of each other; and the at least one x-ray source and the receptor being juxtaposed for directing the x-ray beam to the imaging face of the receptor for a variety of diagnostic x-ray protocols.

However, Negrelli did not teach an upwardly extending, floor-supported column supporting the receptor. Instead, Negrelli disclosed a system with the opposite arrangement comprising: an upwardly extending, floor-supported column supporting the x-ray source; and a

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downwardly extending, ceiling-supported column supporting the receptor. Furthermore, Negrelli did not teach protocols in which the source is above the receptor and protocols for lateral imaging in which the source and receptor are at matching level.

Stenfors disclosed a C-arm x-ray examination apparatus that could scan a patient laterally (Fig. 3).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to switch the positions of the receptor and the x-ray source, since a person in the art would recognize that these two configurations (and the protocols) are completely equivalent as long as the x-ray source and the receptor are directed toward each other and the receptor intercepts the x-ray beam after it has traversed the patient; it is purely a design choice. Furthermore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to include protocols for lateral imaging in Negrelli's system, since a person would be motivated to configure the system for as many C-arm protocols as possible (column 2, lines 59-63), which is less expensive than purchasing new equipment.

With regard to claim 4, Negrelli in combination with Stenfors disclosed a system as in claim 1, wherein the receptor has at least five degrees of freedom relative to the column (four rotational degrees of freedom **100**, **102**, **108**, **110**, and one translational degree of freedom **104**, **106**).

With regard to claim 5, Negrelli in combination with Stenfors disclosed a system as in claim 1, further including motorized drivers for moving the receptor (column 6, lines 8-13).

3. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Negrelli (U. S. Patent No. 6,200,024 B1) and Stenfors (U. S. Patent No. 6,309,102 B1) as applied to claim 1 above, and further in view of Narita (U. S. Patent No. 5,226,069).

With regard to claim 6, Negrelli in combination with Stenfors disclosed a system as in claim 1. However, Negrelli and Stenfors fail to teach that the system further includes encoders coupled with the column to provide digital information regarding the movement of the column, and a computer coupled with the encoders to receive digital information from the encoders and programmed to utilize the information to control the movement.

Narita disclosed a system (Fig. 13) comprising a computer (65) that utilizes information from encoders (13G', 14C', 52C', 54D') to control the motors (13G, 14C, 52C, 54D).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to provide a computer that controls motors based on feedback signals generated by encoders, since a person would be motivated to set up a feedback loop to confirm the actual position.

4. Claims 2 and 3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hauck *et al.* (U. S. Patent No. 4,501,011) in view of Roos *et al.* (U. S. Patent No. 6,041,097).

With regard to claim 2, Hauck *et al.* disclosed a system positioning an x-ray receptor for a variety of diagnostic x-ray protocols, comprising: an x-ray source (22) selectively emitting an x-ray beam; an x-ray receptor (24), which is an image intensifier, having an imaging face; a first track supporting (50), for movement along the first track (72), a first downwardly extending, telescoping column (42) that in turn supports the source for movement up and down, rotating about a first up-down axis (column 3, line 47), and rotating about a first lateral axis (58)

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transverse to the first up-down axis, to thereby position and orient the x-ray beam for a variety of x-ray imaging protocols; a second track supporting (52), for movement along the second track (82), a second, downwardly extending, telescoping column (44) that in turn supports the receptor for movement up and down, rotating about a second up-down axis (column 3, lines 56-57), and rotating about a second lateral axis (60) transverse to the second up-down axis, to thereby position and orient the imaging face of the receptor to match the position and orientation of the x-ray beam for the variety of x-ray imaging protocols, including protocols in which the source is above the receptor (column 2, lines 9-18) and protocols for lateral imaging in which the source and receptor are at matching levels (column 2, lines 5-8); the first and second tracks being spaced apart from each other to allow movement of the first column along the first track that is independent of movement of the second column along the second track (column 4, lines 1-2).

However, Hauck *et al.* did not disclose a system that employs a digital flat panel x-ray receptor.

Roos *et al.* taught that a digital flat panel x-ray receptor has many advantages over an image intensifier (column 5, lines 24-33). For example, digital flat-panel receptors are free from geometric distortion that exists in image intensifiers.

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to employ a digital flat panel x-ray receptor in the system disclosed by Hauck *et al.*, since a person would be motivated to avoid the defects that exist in an image intensifier, which might cause misdiagnosis.

With regard to claim 3, Hauck *et al.* disclosed a system positioning an x-ray receptor for a variety of diagnostic x-ray protocols, comprising: an x-ray source (22) selectively emitting an

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x-ray beam and positioning the beam at positions and orientations for a variety of x-ray imaging protocols, and a supporting structure (42) for the x-ray source; an x-ray receptor (24), which is an image intensifier, having an imaging face; a track supporting (52), for movement along the track (82), a downwardly extending, telescoping column (44) that in turn supports the receptor for movement up and down, rotating about an up-down axis (column 3, lines 56-57), and rotating about a lateral axis (60) transverse to the up-down axis, to thereby position and orient the imaging face of the receptor to match the position and orientation of the x-ray beam for the variety of x-ray imaging protocols, including protocols in which the source is above the receptor (column 2, lines 9-18) and protocols for lateral imaging in which the source and receptor are at matching levels (column 2, lines 5-8); the track being spaced from the supporting structure for the x-ray source to allow movement of the column along the track that is independent of movement of the x-ray source or the support thereof (column 4, lines 1-2).

However, Hauck *et al.* did not disclose a system that employs a digital flat panel x-ray receptor.

Roos *et al.* taught that a digital flat panel x-ray receptor has many advantages over an image intensifier (column 5, lines 24-33). For example, digital flat-panel receptors are free from geometric distortion that exists in image intensifiers.

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to employ a digital flat panel x-ray receptor in the system disclosed by Hauck *et al.*, since a person would be motivated to avoid the defects that exist in an image intensifier, which might cause misdiagnosis.

Allowable Subject Matter

5. Claim 7 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

6. The following is a statement of reasons for the indication of allowable subject matter:

With regard to claim 7, the prior art fails to teach or fairly suggest a flat panel x-ray receptor that moves in at least two translational and three rotational degrees of motions as claimed.

Response to Arguments

7. With respect to claim 1, the examiner does not dispute applicants' contention that Negrelli taught away from the use of C-arm apparatuses. After all, Negrelli's robotic virtual C-arm was designed to replace the conventional C-arms. However, it follows logically that Negrelli's robotic virtual C-arm would be capable of performing many of the C-arm protocols that it is designed to mimic. In fact, Negrelli specifically taught that the virtual C-arm support system would have all of the capabilities of the prior art mechanical C-arm imaging devices (column 2, lines 59-63). The examiner cited the Stenfors patent because it teaches a conventional C-arm that is capable of performing lateral imaging (Fig. 3). Therefore, the robotic virtual C-arm disclosed by Negrelli would be capable of performing lateral imaging as well. Accordingly, the rejection is maintained.

8. With regard to claims 2 and 3, the Roos patent was only relied upon to teach the benefit of using a digital flat panel over an image intensifier. A person skilled in the art would substitute

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a digital flat-panel receptor for an image intensifier because digital flat-panel receptors are free from geometric distortion that exists in image intensifiers. Furthermore, a person skilled in the art would recognize the difference between a digital flat-panel receptor and an image intensifier and adapt appropriate hardware and software in the system disclosed by Hauck *et al.* that would work with the digital flat-panel receptor. Accordingly, the rejection is maintained.

9. In response to applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Allen C. Ho whose telephone number is (703) 308-6189. The examiner can normally be reached on Monday - Friday from 8:00 am - 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward J. Glick can be reached at (703) 308-4858. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9318.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0530.

Allen C. Ho

Allen C. Ho
Patent Examiner
Art Unit 2882

ACH